Statement of Dr. Terrie Wetle
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I am Dr. Terrie Wetle, Deputy Director of the National Institute on Aging, and on behalf of the Institute and our Director, Dr. Richard Hodes, I thank you for asking the NIA to participate in this important hearing. I applaud you, Mr. Chairman, and the other members of the committee, for your leadership and for recognizing and promoting the benefits of exercise for older people.

As the 16th century explorer Juan Ponce de Leon discovered, the fountain of youth does not exist. Aging is an inevitable phase of the life cycle. In the twentieth century though, we have discovered a key to helping people feel younger and stay healthier--exercise. Exercise, while it does not guarantee eternal youth, can help prolong healthy life and improve the quality of that life, especially in later years. Recent scientific research advances support these assertions.

Americans would pay almost any price for a pill that contained all the benefits associated with exercise: increased life expectancy, improved mental health, and decreased disability. Scientific research has shown repeatedly that exercise can benefit both the body and mind. Unfortunately, despite the proven benefits of exercise, many Americans

--especially older Americans--are not engaging in regular, sufficient physical activity. NIA supported research is expanding our understanding of the benefits of physical fitness as well as the factors that motivate and deter people from making exercise a part of their daily routine. The importance of exercise research cannot be underestimated--particularly as our population ages.

Exercise and Older Adults

In 1996, the Surgeon General's office issued its landmark report, "Physical Activity and Health." This report, which featured a comprehensive review of relevant research, included revealing statistics about levels of physical activity among people of varying ages. Regardless of the survey, results were consistent: older adults are likely to be more inactive than individuals in other age groups. According to survey data from 1988 to 1992, fewer than one in four adults aged 18-29 years engaged in no physical activity (aerobic, flexibility and muscle strength activities), whereas about one in three men and one in two women over 74 years of age were inactive.

Chart I depicts data from the third National Health and Nutrition Examination Survey (NHANES) (1988-1991) and illustrates how inactivity rates increase as people age. Moreover, women are considerably less active than men. According to 1988-1991 NHANES study data, 30 percent of women between the ages of 60-69 engaged in no leisure time activity, as compared to 17 percent of men in the same age group. For individuals 80 years and older, the difference is even more dramatic: 62 percent of women reported engaging in no physical activity as compared to 40 percent of men.

Physical activity levels also differ among racial and ethnic groups. Researchers at American University recently assessed NHANES data and concluded that the age-adjusted prevalence of leisure-time inactivity is higher among African Americans (35%) and Mexican Americans (40%) than among Caucasians (18%). These differences persisted across almost every demographic category, including age, education, family income, occupation, employment, poverty and marital status. The message is clear: regardless of gender and socio-economic status, older people are not exercising as much as they should to achieve the many health benefits that scientific research has linked to regular physical activity.

The Benefits of Exercise

Simply stated, exercise can improve your mood, relieve moderate depression, and help delay the onset of disabilities and life-threatening diseases. Lack of physical activity and poor diet, taken together, are the second largest underlying causes of death in the United States. (Smoking is the number one cause.) People who exercise not only feel better, they live healthier, longer lives than their non-active counterparts. The good news is that it is never too late to start, and even moderate exercise can have a beneficial effect.

Prevents Disability

Studies have shown that moderate physical activity may prevent disability later in life. Recent epidemiological analyses supported by the NIA demonstrate that disability-free life expectancy is substantially longer in persons who engage in exercise. In a study published this year in the American Journal of Epidemiology, NIA-supported researchers reported that physically active older individuals had a twofold-increased likelihood of living the remainder of their lives with no disability compared with sedentary adults. They were more likely not only to live to advanced old age, but also to remain independent in basic self-care activities in the year prior to their deaths (Leveille, et al., *Am J Epidemiol*, 1999). It should be noted that moderate physical activity in this study included walking and gardening--two activities that are feasible for many older adults. The positive effects of moderate exercise, in particular walking, were reaffirmed as recently as last month when the New England Journal of Medicine published findings from the Nurses' Health Study supported by the National Heart, Lung, and Blood Institute that concluded brisk walking three hours a week can cut the risk of heart disease in women by as much as 40 percent, equivalent to the benefits of regular, more vigorous exercise.

May Increase Life Expectancy

Studies have begun to identify a link between exercise and increased life expectancy.

Dr. Steven Blair and colleagues at the Cooper Institute in Dallas demonstrated that higher fitness (as measured by performance on an exercise treadmill test) is associated with lower mortality rates in men. Their study (Chart II) included 9,000 men aged 20 to 82 and compared death rates in physically unfit men who remained unfit over five years with men who became fit during the same period. The study found that unfit men aged 60 and over who became fit had death rates 50 percent lower than those who remained unfit. This relationship could be due either to factors, which are beyond the individual's control (e.g. variations in aerobic power among individuals due to genetic factors), or to aspects of fitness that are modifiable by factors such as physical activity, or to both kinds of factors (Blair, *JAMA*, 1995). There may also be a self-selection bias as to who chose to become fit. Nonetheless, the findings provide powerful evidence as to the potential health benefits of exercise. Future research is necessary to elucidate the relationship of exercise to this observed reduction in cardiovascular disease mortality rates among men.

The health benefits of a healthy lifestyle are considerable. For example, persons who both exercise and avoid smoking live longer. In a collaborative study by NIA researchers and the National Research Institute in Florence, Italy, non-smokers were found to live about five years longer than smokers do. People who reported moderate to high levels of exercise lived three or more years longer than less active study participants--whether or not they had ever smoked (Ferrucci, et al., *Am J Epidemiol,* 1999). Healthy habits of avoiding smoking and engaging in exercise each by themselves contribute to active life expectancy, and the best outcome is for those who both exercise regularly and avoid smoking.

Reduces Symptoms Associated with Chronic Diseases and Other Health Conditions

Exercise can also benefit people suffering from a variety of physical ailments, such as osteoarthritis, a common condition and a major cause of pain and activity limitation in older people. The Fitness Arthritis and Seniors Trial (FAST), conducted by the Bowman Gray School of Medicine and University of Tennessee Older Americans Independence Center, tested the long-term utility of two types of exercise, aerobic training (walking) and resistance training (weight lifting), in helping older people with knee osteoarthritis maintain their function and quality of life. Participants in weight lifting or aerobic training reported less pain and better function than those participating in a health education group. The rate of injury was very small and there was no evidence the arthritis was made worse by exercise (Ettinger, et al., *JAMA,* 1997). Other studies have examined the effects of exercise on other conditions, such as chronic pain and peripheral arterial disease, and observed similar positive results, particularly regarding improved pain management.

The effects of exercise on the body's neurological functions have also been studied. Moderate exercise improves quality of sleep among elders with no symptoms of depression as well as persons who have depression (Singh, *Sleep,* 1997). In addition, animal studies tell us that exercise can enhance generation of brain cells, which may someday mean that neurons lost through age, trauma, or disease might be replaced via a prescribed regimen of exercise (Kemperman, et. al., *Nature*, 1997 ; Kemperman, et.al., *Jour Neuroscience,*1998 ;Van Praag, et.al., *Nature* and *Neuroscience* 1997).

Improves Fitness and Reduce Falls

Exercise, specifically high-intensity resistance training, can counteract muscle weakness and physical frailty even in very elderly people. Controlled studies in frail nursing home residents, both men and women from 72 to 98 years of age, found that a ten-week resistance exercise program approximately doubled leg strength, increased walking speed by 11 percent, improved stair-climbing power by 28%, and led to increased spontaneous physical activity, when compared with controls (Fiatarone, *NEJM*, 1994).

Exercise interventions have also been incorporated into successful fall prevention strategies. Every year, more than 250,000 hip fractures occur among older persons. Falls are the primary cause of these costly and painful injuries. Researchers at the Yale University Older Americans Independence Center conducted the first randomized controlled trial using a variety of interventions, including strength training, to reduce falls in older people. Over a one-year follow-up period, the treated subjects had a 44% lower rate of falls than a control group that received social visits only. The intervention was also shown to be cost-effective, particularly among individuals at high risk for falling. The results show that intervention strategies reduced the average annual cost of health care for high-risk individuals by nearly $3,700 (Tinetti, et al., *NEJM*, 1994 and Rizzo, et al., Medical Care, 1996).

Encouraging Exercise Across the Life Span

Despite increasing, compelling evidence about the benefits of exercise, we still have trouble convincing people to adopt active lifestyles. As a result, the NIA is supporting research to understand both what motivates older people to exercise and precludes them from making a long-term commitment to an exercise program.

The research has shown that effective strategies for encouraging people to exercise includes the adoption of home-based programs. A study conducted by researchers at Boston University found that a home-based exercise training program, called Strong-for-Life, which consisted of a series of videotaped exercise routines using elastic bands and motivational messages (and, for half of the group, instruction from a physical therapist) improved exercise participation rates (Jette, et al., *AJPH*, 1999). Programs

tailored to meet an individual's needs and preferences can also help to improve participation rates. In a survey conducted last year by researchers at Stanford University, more than half of the older respondents (67%) reported that they preferred to exercise on their own with some instruction rather than in an exercise class (Wilcox, King et al., *Jour of Aging and Phy Activ,* 1999).

The Community Healthy Activities Model Program for Seniors (CHAMPS) is an example of a successful physical activity promotion program that tailors the activity to accommodate each person's health problems, preferences for type of activity, ability, and other factors. The program, having been pilot tested with elders living in low-income congregate housing and with members of a Medicare HMO, demonstrated that over a one-year period it was successful in increasing the physical activity level of people 65 years or older. At two years, participants maintained about half of the increased levels of physical activity (Stewart et al., *Annals of Beh Med,* 1997 and Stewart et.al., Presentation at Cooper Institute, 1997). CHAMPS has become a model for a program offered through the State of California Department of Health Services through their Physical Activity "Active Aging Community Mini-Grant Program."

Last year, the National Institute on Aging published a free manual, *Exercise: A Guide from the National Institute on Aging,* which is the cornerstone of the Institute's ongoing campaign to encourage older people to exercise. The Guide, which is based on scientific evidence, is intended to help people design their own exercise program so they will maintain and enjoy it. It offers safety tips and information about nutrition, and demonstrates a variety of easy stretching, balance, and strength training exercises people can do at home with equipment as simple as a chair and empty milk jugs filled with sand. To date, the Institute has distributed over 200,000 copies of the guide. Former United States Senator John Glenn is helping NIA promote the guide, and public service announcements (PSA) have run on television and radio stations throughout the country, encouraging people to order it. The Institute is honored that the National Academy of Television Arts and Sciences recently nominated its series of exercise PSAs for an Emmy.

Accommodating individual needs though is not enough to ensure that people will start and maintain an exercise program. Researchers have learned that ethnicity can affect the perceptions individuals have about exercise and their willingness to enter and participate in community-based exercise programs. Interventions can be more effective if they are adapted to cultural expectations and beliefs and community structures. For example, an aerobic dance class using music familiar to a particular ethic group may be particularly effective in encouraging compliance in participation.

People are also more likely to be motivated to exercise if their physician recommends it. Unfortunately, a study conducted by researchers at the University of California at San Francisco found that less than 50% of older adults ever receive a physician's suggestion to exercise (Damush et al., *Jour Geron Med Sci,* 1999). This finding suggests that physicians should be encouraged to recommend exercise for older people if we expect to see physical activity rates increase in the future.

Future Directions

The amount of information research has uncovered about the positive effects of exercise is impressive. Nonetheless, many questions remain unanswered about exercise and its role in improving the health of older people.

Recently reported research in declining disability rates among older persons may be associated with improved health habits. In 1997, Dr. Kenneth Manton and his colleagues at Duke University published findings, based on waves of data from the National Long-Term Care Study, which demonstrated a

dramatic and unexpected reduction in rates of disability among older persons. Manton calculated that at least 1.4 million fewer older Americans were disabled in 1994 than there would have been if disability rates had not improved since 1982, and that these reductions accelerated over the 12 years (Chart III). Manton's conclusions were met with considerable skepticism, and efforts were launched to either disprove or support these findings.

In early 1998, Vicki Freedman and Linda Martin of RAND, using a different dataset and different measures of functional ability, found equally large declines from 1984 to 1993 in the prevalence of chronic disability, after controlling for changes in the composition of the population during the study period. They also found that improvements in functioning in absolute terms were greatest among those 80 and older. The extent to which physical activity has played a role in this decline in disability, or may play a role in accelerating the rate of disability decline in the future, are questions that researchers will continue to examine.

The NIA, as well as other Institutes at the National Institutes of Health, are committed to funding high quality research that enhances our understanding of exercise and how people of all ages can be motivated to engage in physical activity. NIH, as an indication of its commitment to this area of research, has issued a request for applications (RFA) that is being supported by 17 of the NIH Institutes, including NIA, several NIH central offices and the American Heart Association. This RFA will support research on interventions designed to achieve long-term health behavior change. Insufficient exercise is one of the health behaviors that will be examined by projects funded under the RFA.

We anticipate sharing these advances with the Congress and working with you and your colleagues to promote good health practices with the American people.

Once again, thank you for inviting the NIA to participate in today's hearing. I look forward to answering your questions.